



71369-262.ST25

## SEQUENCE LISTING

<110> Popoff, Steven N.  
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Smock, Steven L.

<120> Osteoactivin Protein and Nucleic Acids Encoding the Same,  
Compositions and Methods of Stimulating Bone Differentiation

<130> 71369.262

<140> US 09/943,075

<141> 2001-08-30

<150> US 60/229,006

<151> 2000-08-30

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gaa agt ctc tgc ggg gtc ctg gta ttt ctg ctg ctg gct gca gga ctg 165
Glu Ser Leu Cys Gly Val Leu Val Phe Leu Leu Leu Ala Ala Gly Leu
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Pro Leu Gln Ala Ala Lys Arg Phe Arg Asp Val Leu Gly His Glu Gln
      20                      25                      30

tat ccg gat cac atg agg gag aac aac caa tta cgt ggc tgg tct tca 261
Tyr Pro Asp His Met Arg Glu Asn Asn Gln Leu Arg Gly Trp Ser Ser
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gat gaa aat gaa tgg gat gaa cag ctg tat cca gtg tgg agg agg gga 309
Asp Glu Asn Glu Trp Asp Glu Gln Leu Tyr Pro Val Trp Arg Arg Gly
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Glu Gly Arg Trp Lys Asp Ser Trp Glu Gly Gly Arg Val Gln Ala Ala
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Val Asn Leu Val Phe Pro Arg Cys Gln Lys Glu Asp Ala Asn Gly Asn	
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atc gtc tat gag agg aac tgc aga agt gat ttg gag ctg gct tct gac	501
Ile Val Tyr Glu Arg Asn Cys Arg Ser Asp Leu Glu Leu Ala Ser Asp	
115 120 125	
ccg tat gtc tac aac tgg acc aca ggg gca gac gat gag gac tgg gaa	549
Pro Tyr Val Tyr Asn Trp Thr Thr Gly Ala Asp Asp Glu Asp Trp Glu	
130 135 140 145	
gac aac acc agc caa ggc cag cac ctc agg ttc ccc gac ggg aag ccc	597
Asp Asn Thr Ser Gln Gly Gln His Leu Arg Phe Pro Asp Gly Lys Pro	
150 155 160	
ttc cct cgc ccc cac gga cgg aag aaa tgg aac ttc gtc tac gtc ttc	645
Phe Pro Arg Pro His Gly Arg Lys Lys Trp Asn Phe Val Tyr Val Phe	
165 170 175	
cac aca ctt ggt cag tat ttt caa aag ctg ggt cag tgt tca gca cga	693
His Thr Leu Gly Gln Tyr Phe Gln Lys Leu Gly Gln Cys Ser Ala Arg	
180 185 190	
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Val Ser Ile Asn Thr Val Asn Leu Thr Val Gly Pro Gln Val Met Glu	
195 200 205	
gtg att gtc ttt cga aga cac ggc cgg gca tac att ccc atc tcc aaa	789
Val Ile Val Phe Arg His Gly Arg Ala Tyr Ile Pro Ile Ser Lys	
210 215 220 225	
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Val Lys Asp Val Tyr Val Ile Thr Asp Gln Ile Pro Ile Phe Val Thr	
230 235 240	
atg tac cag aag aat gac cgg aac tcg tct gat gaa acc ttc ctc aga	885
Met Tyr Gln Lys Asn Asp Arg Asn Ser Ser Asp Glu Thr Phe Leu Arg	
245 250 255	
gac ctc ccc att ttc ttc gat gtc ctc att cac gat ccc agt cat ttc	933
Asp Leu Pro Ile Phe Phe Asp Val Leu Ile His Asp Pro Ser His Phe	
260 265 270	
ctc aac tac tct gcc att tcc tac aag tgg aac ttt ggg gac aac act	981
Leu Asn Tyr Ser Ala Ile Ser Tyr Lys Trp Asn Phe Gly Asp Asn Thr	
275 280 285	
ggc ctg ttt gtc tcc aac aat cac act ttg aat cac acg tat gtg ctc	1029
Gly Leu Phe Val Ser Asn Asn His Thr Leu Asn His Thr Tyr Val Leu	
290 295 300 305	

aat gga acc ttc aac ttt aac ctc acc gtg caa act gca gtg ccg gga	1077
Asn Gly Thr Phe Asn Phe Asn Leu Thr Val Gln Thr Ala Val Pro Gly	
310 315 320	
cca tgc ccc tca ccc aca cct tcg cct tct tct tcg act tct cct tcg	1125
Pro Cys Pro Ser Pro Thr Pro Ser Pro Ser Ser Ser Thr Ser Pro Ser	
325 330 335	
cct gca tct tcg cct tca ccc aca tta tca aca cct agt ccc tct tta	1173
Pro Ala Ser Ser Pro Ser Pro Thr Leu Ser Thr Pro Ser Pro Ser Leu	
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Met Pro Thr Gly Tyr Lys Ser Met Glu Leu Ser Asp Ile Ser Asn Glu	
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aac tgc cga ata aac aga tat ggt tac ttc aga gcc acc atc aca att	1269
Asn Cys Arg Ile Asn Arg Tyr Gly Tyr Phe Arg Ala Thr Ile Thr Ile	
370 375 380 385	
gta gat gga atc cta gaa gtc aac atc atc cag gta gca gat gtc cca	1317
Val Asp Gly Ile Leu Glu Val Asn Ile Ile Gln Val Ala Asp Val Pro	
390 395 400	
atc ccc aca ctg cag cct gac aac tca ctg atg gac ttc att gtg acc	1365
Ile Pro Thr Leu Gln Pro Asp Asn Ser Leu Met Asp Phe Ile Val Thr	
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Cys Lys Gly Ala Thr Pro Thr Glu Ala Cys Thr Ile Ile Ser Asp Pro	
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acc tgc cag atc gcc cag aac agg gtg tgc agc ccg gtg gct gtg gat	1461
Thr Cys Gln Ile Ala Gln Asn Arg Val Cys Ser Pro Val Ala Val Asp	
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gag ctg tgc ctc ctg tcc gtg agg aga gcc ttc aat ggg tcc ggc acg	1509
Glu Leu Cys Leu Leu Ser Val Arg Arg Ala Phe Asn Gly Ser Gly Thr	
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tac tgt gtg aat ttc act ctg gga gac gat gca agc ctg gcc ctc acc	1557
Tyr Cys Val Asn Phe Thr Leu Gly Asp Asp Ala Ser Leu Ala Leu Thr	
470 475 480	
agc gcc ctg atc tct atc cct ggc aaa gac cta ggc tcc cct ctg aga	1605
Ser Ala Leu Ile Ser Ile Pro Gly Lys Asp Leu Gly Ser Pro Leu Arg	
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aca gtg aat ggt gtc ctg atc tcc att ggc tgc ctg gcc atg ttt gtc	1653
Thr Val Asn Gly Val Leu Ile Ser Ile Gly Cys Leu Ala Met Phe Val	
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acc atg gtt acc atc ttg ctg tac aaa aaa cac aag acg tac aag cca	1701
Thr Met Val Thr Ile Leu Leu Tyr Lys Lys His Lys Thr Tyr Lys Pro	
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Ile Gly Asn Cys Thr Arg Asn Val Val Lys Gly Lys Gly Leu Ser Val
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Phe Leu Ser His Ala Lys Ala Pro Phe Ser Arg Gly Asp Arg Glu Lys
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gat cca ctg ctc cag gac aag cca tgg atg ctc taa gtcttcactc 1843
Asp Pro Leu Leu Gln Asp Lys Pro Trp Met Leu *
                    565                               570

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<213> Rat osteoactivin

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Gln Tyr Pro Asp His Met Arg Glu Asn Asn Gln Leu Arg Gly Trp Ser
 35          40          45
Ser Asp Glu Asn Glu Trp Asp Glu Gln Leu Tyr Pro Val Trp Arg Arg
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Gly Glu Gly Arg Trp Lys Asp Ser Trp Glu Gly Gly Arg Val Gln Ala
 65          70          75          80
Ala Leu Thr Ser Asp Ser Pro Ala Leu Val Gly Ser Asn Ile Thr Phe
 85          90          95
Val Val Asn Leu Val Phe Pro Arg Cys Gln Lys Glu Asp Ala Asn Gly
100          105          110
Asn Ile Val Tyr Glu Arg Asn Cys Arg Ser Asp Leu Glu Leu Ala Ser
115          120          125
Asp Pro Tyr Val Tyr Asn Trp Thr Thr Gly Ala Asp Asp Glu Asp Trp
130          135          140
Glu Asp Asn Thr Ser Gln Gly Gln His Leu Arg Phe Pro Asp Gly Lys
145          150          155          160
Pro Phe Pro Arg Pro His Gly Arg Lys Lys Trp Asn Phe Val Tyr Val
165          170          175
Phe His Thr Leu Gly Gln Tyr Phe Gln Lys Leu Gly Gln Cys Ser Ala
180          185          190
Arg Val Ser Ile Asn Thr Val Asn Leu Thr Val Gly Pro Gln Val Met
195          200          205
Glu Val Ile Val Phe Arg Arg His Gly Arg Ala Tyr Ile Pro Ile Ser
210          215          220
Lys Val Lys Asp Val Tyr Val Ile Thr Asp Gln Ile Pro Ile Phe Val
225          230          235          240
Thr Met Tyr Gln Lys Asn Asp Arg Asn Ser Ser Asp Glu Thr Phe Leu

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Phe	Leu	Asn	Tyr	Ser	Ala	Ile	Ser	Tyr	Lys	Trp	Asn	Phe	Gly	Asp	Asn	
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Thr	Gly	Leu	Phe	Val	Ser	Asn	Asn	His	Thr	Leu	Asn	His	Thr	Tyr	Val	
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Leu	Asn	Gly	Thr	Phe	Asn	Phe	Asn	Leu	Thr	Val	Gln	Thr	Ala	Val	Pro	
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Ser	Pro	Ala	Ser	Ser	Pro	Ser	Pro	Thr	Leu	Ser	Thr	Pro	Ser	Pro	Ser	
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Leu	Met	Pro	Thr	Gly	Tyr	Lys	Ser	Met	Glu	Leu	Ser	Asp	Ile	Ser	Asn	
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Glu	Asn	Cys	Arg	Ile	Asn	Arg	Tyr	Gly	Tyr	Phe	Arg	Ala	Thr	Ile	Thr	
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Ile	Val	Asp	Gly	Ile	Leu	Glu	Val	Asn	Ile	Ile	Gln	Val	Ala	Asp	Val	
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Pro	Ile	Pro	Thr	Leu	Gln	Pro	Asp	Asn	Ser	Leu	Met	Asp	Phe	Ile	Val	
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Thr	Cys	Lys	Gly	Ala	Thr	Pro	Thr	Glu	Ala	Cys	Thr	Ile	Ile	Ser	Asp	
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Pro	Thr	Cys	Gln	Ile	Ala	Gln	Asn	Arg	Val	Cys	Ser	Pro	Val	Ala	Val	
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Asp	Glu	Leu	Cys	Leu	Leu	Ser	Val	Arg	Arg	Ala	Phe	Asn	Gly	Ser	Gly	
				450				455				460				
Thr	Tyr	Cys	Val	Asn	Phe	Thr	Leu	Gly	Asp	Asp	Ala	Ser	Leu	Ala	Leu	
465					470				475				480			
Thr	Ser	Ala	Leu	Ile	Ser	Ile	Pro	Gly	Lys	Asp	Leu	Gly	Ser	Pro	Leu	
				485				490				495				
Arg	Thr	Val	Asn	Gly	Val	Leu	Ile	Ser	Ile	Gly	Cys	Leu	Ala	Met	Phe	
				500				505				510				
Val	Thr	Met	Val	Thr	Ile	Leu	Leu	Tyr	Lys	Lys	His	Lys	Thr	Tyr	Lys	
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Pro	Ile	Gly	Asn	Cys	Thr	Arg	Asn	Val	Val	Lys	Gly	Lys	Gly	Leu	Ser	
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Val	Phe	Leu	Ser	His	Ala	Lys	Ala	Pro	Phe	Ser	Arg	Gly	Asp	Arg	Glu	
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Lys	Asp	Pro	Leu	Leu	Gln	Asp	Lys	Pro	Trp	Met	Leu					
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<212> PRT
<213> Rat osteoactivin
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&lt;213&gt; Rat osteoactivin

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 Asp Lys Cys

&lt;210&gt; 5

&lt;211&gt; 574

&lt;212&gt; PRT

&lt;213&gt; Mouse

&lt;400&gt; 5

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 20 25 30  
 Gln Tyr Pro Asp His Met Arg Glu His Asn Gln Leu Arg Gly Trp Ser  
 35 40 45  
 Ser Asp Glu Asn Glu Trp Asp Glu His Leu Tyr Pro Val Trp Arg Arg  
 50 55 60  
 Gly Asp Gly Arg Trp Lys Asp Ser Trp Glu Gly Gly Arg Val Gln Ala  
 65 70 75 80  
 Val Leu Thr Ser Asp Ser Pro Ala Leu Val Gly Ser Asn Ile Thr Phe  
 85 90 95  
 Val Val Asn Leu Val Phe Pro Arg Cys Gln Lys Glu Asp Ala Asn Gly  
 100 105 110  
 Asn Ile Val Tyr Glu Lys Asn Cys Arg Asn Asp Leu Gly Leu Thr Ser  
 115 120 125  
 Asp Leu His Val Tyr Asn Trp Thr Ala Gly Ala Asp Asp Gly Asp Trp  
 130 135 140  
 Glu Asp Gly Thr Ser Arg Ser Gln His Leu Arg Phe Pro Asp Arg Arg  
 145 150 155 160  
 Pro Phe Pro Arg Pro His Gly Trp Lys Lys Trp Ser Phe Val Tyr Val  
 165 170 175  
 Phe His Thr Leu Gly Gln Tyr Phe Gln Lys Leu Gly Arg Cys Ser Ala  
 180 185 190  
 Arg Val Ser Ile Asn Thr Val Asn Leu Thr Ala Gly Pro Gln Val Met  
 195 200 205  
 Glu Val Thr Val Phe Arg Arg Tyr Gly Arg Ala Tyr Ile Pro Ile Ser  
 210 215 220  
 Lys Val Lys Asp Val Tyr Val Ile Thr Asp Gln Ile Pro Val Phe Val  
 225 230 235 240  
 Thr Met Ser Gln Lys Asn Asp Arg Asn Leu Ser Asp Glu Ile Phe Leu  
 245 250 255  
 Arg Asp Leu Pro Ile Val Phe Asp Val Leu Ile His Asp Pro Ser His  
 260 265 270  
 Phe Leu Asn Asp Ser Ala Ile Ser Tyr Lys Trp Asn Phe Gly Asp Asn  
 275 280 285  
 Thr Gly Leu Phe Val Ser Asn Asn His Thr Leu Asn His Thr Tyr Val  
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 305 310 315 320  
 Gly Pro Cys Pro Pro Pro Ser Pro Ser Thr Pro Pro Ser Pro Ser Thr

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Ser Asn Glu Asn Cys Arg Ile Asn Arg Tyr Gly Tyr Phe Arg Ala Thr
          370          375          380
Ile Thr Ile Val Glu Gly Ile Leu Glu Val Ser Ile Met Gln Ile Ala
385          390          395          400
Asp Val Pro Met Pro Thr Pro Gln Pro Ala Asn Ser Leu Met Asp Phe
          405          410          415
Thr Val Thr Cys Lys Gly Ala Thr Pro Met Glu Ala Cys Thr Ile Ile
          420          425          430
Ser Asp Pro Thr Cys Gln Ile Ala Gln Asn Arg Val Cys Ser Pro Val
          435          440          445
Ala Val Asp Gly Leu Cys Leu Leu Ser Val Arg Arg Ala Phe Asn Gly
          450          455          460
Ser Gly Thr Tyr Cys Val Asn Phe Thr Leu Gly Asp Asp Ala Ser Leu
465          470          475          480
Ala Leu Thr Ser Thr Leu Ile Ser Ile Pro Gly Lys Asp Pro Asp Ser
          485          490          495
Pro Leu Arg Ala Val Asn Gly Val Leu Ile Ser Ile Gly Cys Leu Ala
          500          505          510
Val Leu Val Thr Met Val Thr Ile Leu Leu Tyr Lys Lys His Lys Ala
          515          520          525
Tyr Lys Pro Ile Gly Asn Cys Pro Arg Asn Thr Val Lys Gly Lys Gly
          530          535          540
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Gln Glu Lys Asp Pro Leu Leu Gln Asp Lys Pro Arg Thr Leu
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 <213> Human

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Arg Pro Ser Ala Tyr Met Arg Glu His Asn Gln Leu Asn Gly Trp Ser
          35          40          45
Ser Asp Glu Asn Asp Trp Asn Glu Lys Leu Tyr Pro Val Trp Lys Arg
          50          55          60
Gly Asp Met Arg Trp Lys Asn Ser Trp Lys Gly Gly Arg Val Gln Ala
65          70          75          80
Val Leu Thr Ser Asp Ser Pro Ala Leu Val Gly Ser Asn Ile Thr Phe
          85          90          95
Ala Val Asn Leu Ile Phe Pro Arg Cys Gln Lys Glu Asp Ala Asn Gly
          100          105          110
Asn Ile Val Tyr Glu Lys Asn Cys Arg Asn Glu Ala Gly Leu Ser Ala
          115          120          125
Asp Pro Tyr Val Tyr Asn Trp Thr Ala Trp Ser Glu Asp Ser Asp Gly
          130          135          140

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Glu	Asn	Gly	Thr	Gly	Gln	Ser	His	His	Asn	Val	Phe	Pro	Asp	Gly	Lys	145	150	155	160
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Phe	His	Thr	Leu	Gly	Gln	Tyr	Phe	Gln	Lys	Leu	Gly	Arg	Cys	Ser	Val	180	185	190	
Arg	Val	Ser	Val	Asn	Thr	Ala	Asn	Val	Thr	Leu	Gly	Pro	Gln	Leu	Met	195	200	205	
Glu	Val	Thr	Val	Tyr	Arg	Arg	His	Gly	Arg	Ala	Tyr	Val	Pro	Ile	Ala	210	215	220	
Gln	Val	Lys	Asp	Val	Tyr	Val	Val	Thr	Asp	Gln	Ile	Pro	Val	Phe	Val	225	230	235	240
Thr	Met	Phe	Gln	Lys	Asn	Asp	Arg	Asn	Ser	Ser	Asp	Glu	Thr	Phe	Leu	245	250	255	
Lys	Asp	Leu	Pro	Ile	Met	Phe	Asp	Val	Leu	Ile	His	Asp	Pro	Ser	His	260	265	270	
Phe	Leu	Asn	Tyr	Ser	Thr	Ile	Asn	Tyr	Lys	Trp	Ser	Phe	Gly	Asp	Asn	275	280	285	
Thr	Gly	Leu	Phe	Val	Ser	Thr	Asn	His	Thr	Val	Asn	His	Thr	Tyr	Val	290	295	300	
Leu	Asn	Gly	Thr	Phe	Ser	Leu	Asn	Leu	Thr	Val	Lys	Ala	Ala	Ala	Pro	305	310	315	320
Gly	Pro	Cys	Pro	Pro	Pro	Pro	Pro	Pro	Pro	Arg	Pro	Ser	Lys	Pro	Thr	325	330	335	
Pro	Ser	Leu	Gly	Pro	Ala	Gly	Asp	Asn	Pro	Leu	Glu	Leu	Ser	Arg	Ile	340	345	350	
Pro	Asp	Glu	Asn	Cys	Gln	Ile	Asn	Arg	Tyr	Gly	His	Phe	Gln	Ala	Thr	355	360	365	
Ile	Thr	Ile	Val	Glu	Gly	Ile	Leu	Glu	Val	Asn	Ile	Ile	Gln	Met	Thr	370	375	380	
Asp	Val	Leu	Met	Pro	Val	Pro	Trp	Pro	Glu	Ser	Ser	Leu	Ile	Asp	Phe	385	390	395	400
Val	Val	Thr	Cys	Gln	Gly	Ser	Ile	Pro	Thr	Glu	Val	Cys	Thr	Ile	Ile	405	410	415	
Ser	Asp	Pro	Thr	Cys	Glu	Ile	Thr	Gln	Asn	Thr	Val	Cys	Ser	Pro	Val	420	425	430	
Asp	Val	Asp	Glu	Met	Cys	Leu	Leu	Thr	Val	Arg	Arg	Thr	Phe	Asn	Gly	435	440	445	
Ser	Gly	Thr	Tyr	Cys	Val	Asn	Leu	Thr	Leu	Gly	Asp	Asp	Thr	Ser	Leu	450	455	460	
Ala	Leu	Thr	Ser	Thr	Leu	Ile	Ser	Val	Pro	Asp	Arg	Asp	Pro	Ala	Ser	465	470	475	480
Pro	Leu	Arg	Met	Ala	Asn	Ser	Ala	Leu	Ile	Ser	Val	Gly	Cys	Leu	Ala	485	490	495	
Ile	Phe	Val	Thr	Val	Ile	Ser	Leu	Leu	Val	Tyr	Lys	Lys	His	Lys	Glu	500	505	510	
Tyr	Asn	Pro	Ile	Glu	Asn	Ser	Pro	Gly	Asn	Val	Val	Arg	Ser	Lys	Gly	515	520	525	
Leu	Ser	Val	Phe	Leu	Asn	Arg	Ala	Lys	Ala	Val	Phe	Phe	Pro	Gly	Asn	530	535	540	
Gln	Glu	Lys	Asp	Pro	Leu	Leu	Lys	Asn	Gln	Glu	Phe	Lys	Gly	Val	Ser	545	550	555	560

&lt;210&gt; 7

&lt;211&gt; 1725

&lt;212&gt; DNA



&lt;213&gt; Mouse

&lt;400&gt; 7

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